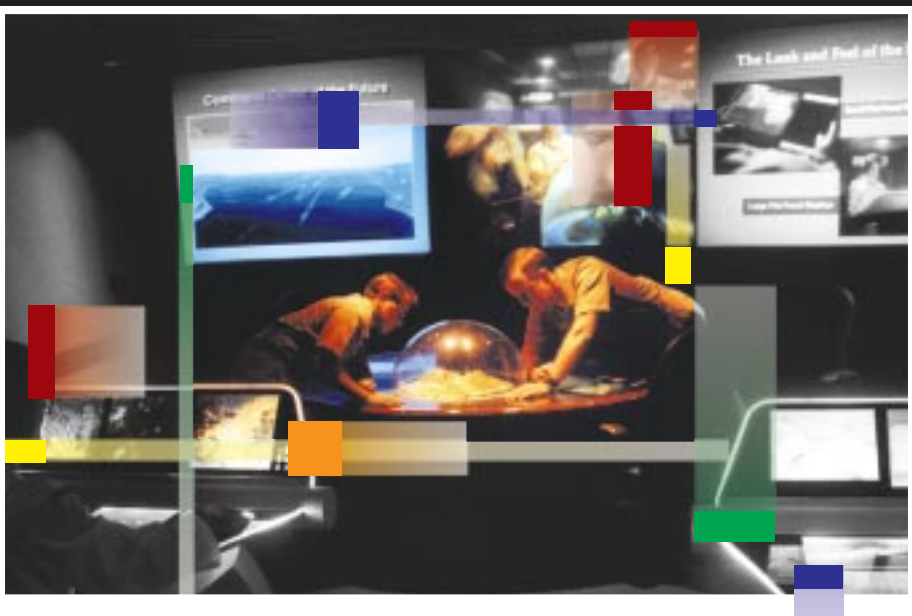

C4ISR Forward ...

A Vision for the Future

SPAWAR

Systems Center San Diego

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The Goal

C4ISR, looking forward to the 21st Century, must have as its overriding goal, to provide our warriors the tools necessary to achieve information dominance over all real and potential enemies. That is a big order. It means that our C4ISR system must provide the right people the right information at the right time in the right context to successfully prosecute any mission, including:

- Peacetime operations/ engagements
- Deterrence and conflict prevention
- Local and theater hostilities

—singly, or as part of a joint or coalition force.

Our overall vision is achieving dominant C4ISR—supporting effective commanders by reducing the fog of war for them while increasing it for the enemy.

Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR)—Integrating disparate units and functions into coordinated operational capabilities.

Information Dominance—Providing the warrior sufficient and timely information and associated tools to plan and execute effectively while denying—through both active and passive means—the enemy adequate information on which to plan and execute effectively.

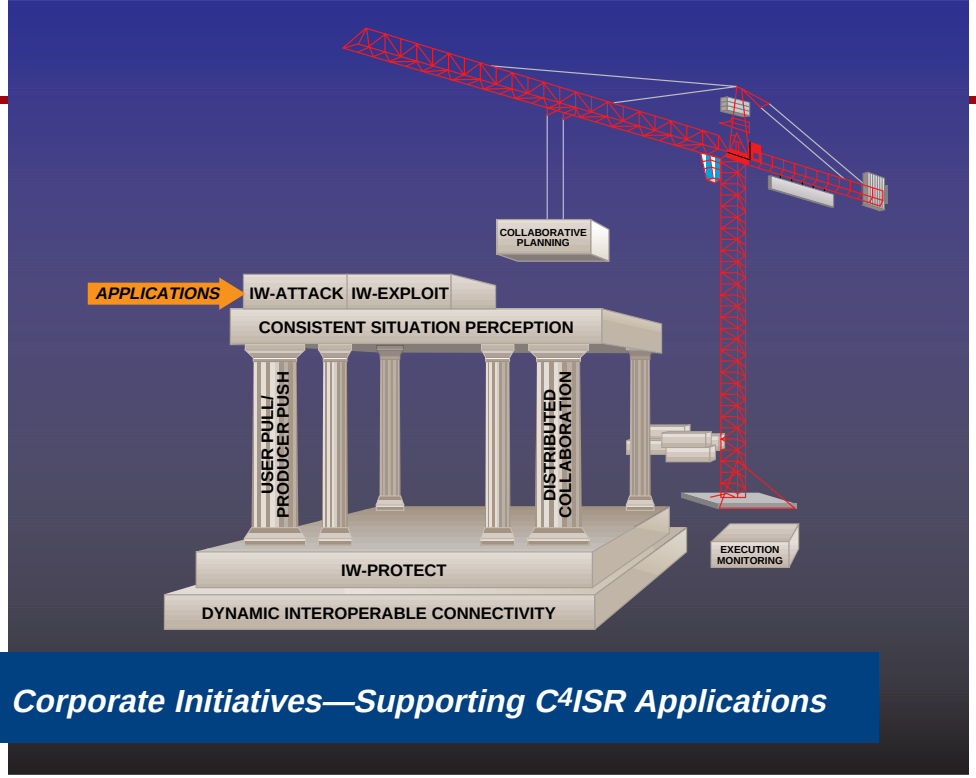
Information—The Heart of the C4ISR Vision

C4ISR is both a process and a system, or more correctly, an aggregate of systems. The process has to do with what we do and how we do it. The "system" is the worldwide network of individual hardware elements and software tools that support decision-making processes.

In the simplest terms, the C4ISR process is about people making decisions in a distributed, multi-mission environment—in sufficient time to have a positive impact on the outcome of an operation. Key to making good decisions is correct understanding of the factors involved, including forces and their capabilities, force distributions, the physical environment, and the political and other constraints in the situation. Achieving inderstanding involves processes for acquiring data and for translating data into information, information into knowledge, and ultimately knowledge into understanding.

Transforming Raw Data into Critical Understanding

Data are useful only if transformed through a process of "distillation," in which vast amounts of raw material (data) are distilled, analyzed, combined, and fused into information and ultimately into small but valuable portions of understanding.



Corporate Initiatives—Supporting C4ISR Applications

Set a Course—Acquisition to Understanding via Our Corporate Initiatives

The course to information dominance is through effective C4ISR. SSC SD's vision—making information dominance a reality—is based on achieving five interrelated objectives, or Corporate Initiatives. Our first initiative, *Dynamic Interoperable Connectivity*, will provide assured connectivity, on demand, in user-selected formats, among warriors and to any desired locations in the "infosphere," the worldwide grid of military databases, fusion centers, national resources, and commercial information. Given this fundamental capability, our second initiative, *User Pull/Producer Push*, will use that connectivity to access strategically located database servers and anchor desks and provide users, at all levels, with key information. Our third initiative, *Distributed Collaboration*, will provide the tools necessary for warriors and their commanders to agree on a wide range of command-related issues. Our fourth initiative, *Consistent Situation Perception*, will facilitate a consistent tactical understanding, or consistent perception, of the operational situation. Our fifth initiative, *Information Warfare*, will protect our information resources while denying our enemy the information needed to implement aggressive actions.

The five SSC SD Corporate Initiatives form the core capability for information dominance. The Corporate Initiatives are interdependent—all five are required as a set in order to provide the operational command with the tools needed for successful command and control:

- Without Dynamic Interoperable Connectivity, User Pull/Producer Push is not assured.
- Without User Pull/Producer Push and Distributed Collaboration, Consistent Situation Perception within a defined battlespace cannot be achieved.
- Without the first four initiatives, planning and replanning of operations cannot take place, nor can those plans be executed in time synchronization.
- Without protective Information Warfare, these initiatives and our ability to perform command and control can be lost.

The C4ISR System of Systems—Attributes

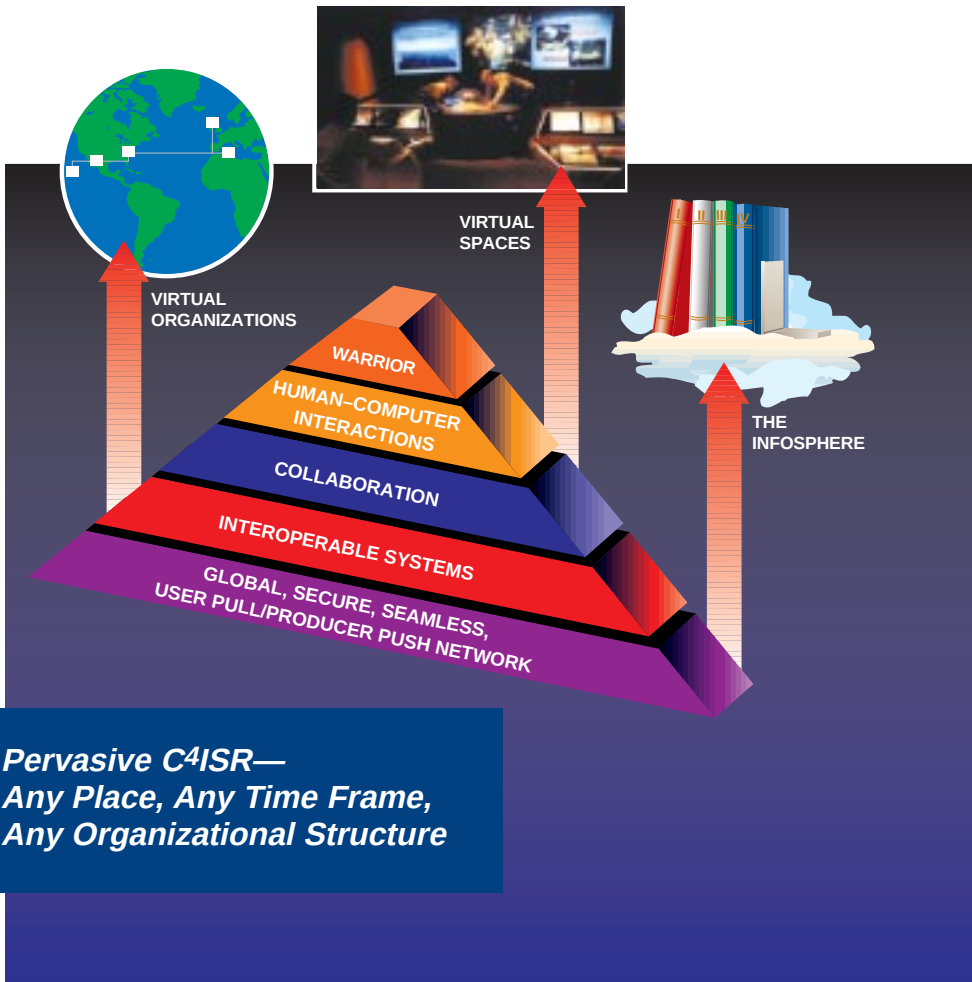
A number of attributes are desired in the C4ISR system of the future. The list of these attributes is open-ended. Attributes can be added as they are identified, and as technology permits their realization. The seven attributes—*user-centric and intuitive*, *integrated*, *interoperable*, *seamless*, *consistent and scalable*, *adaptable/configurable/tailorable*, and *survivable*—represent the set of what appears to be achievable based on both the current baseline of systems in the operational world and the state of current and emerging technology.

User-Centric and Intuitive—*User-centric* means that the C4ISR system of systems will be built for and focus on the needs and requirements of users at all operational levels of command. Making the system *user-intuitive* will enable the system to operate on a level of convenience and performance such that virtually anyone can use it.

Integrated—Integrate is commonly defined as to make into a whole by bringing all parts together, or to unify. Within the context of the C4ISR system of systems, *integrated* means, in essence, that every component and all echelons can be electronically joined, connected, or networked to provide rapid access to the information, service, or point of contact required by a user.

Interoperable—Joint Chiefs of Staff Pub 1-02 provides two definitions of *interoperable*, both of which are applicable to the evolving C4ISR system of systems:

> *The ability of systems, units, or forces to provide services to and accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together.*
>
> *The condition achieved among communications–electronics systems or items of communications–electronics equipment when information or services can be exchanged directly and satisfactorily between them and/or their users.*



Pervasive C4ISR—Any Place, Any Time Frame, Any Organizational Structure

Seamless—Seamlessness is a particularly important attribute in the dynamic operations of the Consistent Situation Perception and User Pull/Producer Push concepts. *Seamless* is defined here as electronic connectivity transparency. Operationally speaking, this means that users need not be concerned with how to get information or where it is located.

Consistent and Scalable—*Consistent* is defined as uniform and applies primarily to the common operating picture. It means that the uniformity of the common operating picture's data content and information presentation will be clearly understood across all echelons of command.

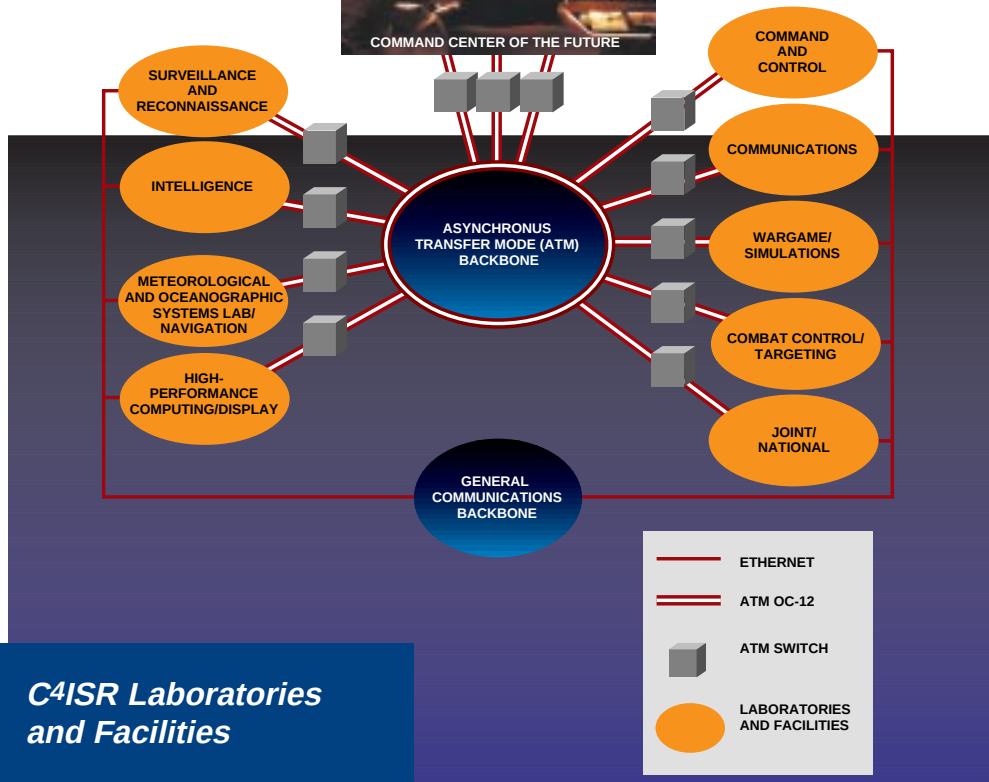
Scalable is defined as flexible in size, modular, or distributed and means that both the Consistent Situation Perception process and the common operating picture can be sized or scoped to fit the particular situation in which it is being applied.

Adaptable/Configurable/Tailorable—From a C4ISR user's viewpoint, *adaptable/configurable/tailorable* means that the system, in supporting both the Consistent Situation Perception and the common operating picture, will be totally responsive to the user's unique requirements for information to support specific missions, tasks, or functions.

Survivable—Survivability can be regarded as a matter of a system's life or death or as a matter of upgrading by degrees. The C4I portion of the C4ISR system of systems is being conceived and implemented with non-developmental item hardware, commercial off-the-shelf hardware and software, and government off-the-shelf software components in an open-systems architecture as a means to allow upgrading by degrees in response to new needs and technical capabilities.

SSC SD's Approach to C4ISR Evolution

The Space and Naval Warfare Systems Center San Diego (SSC SD) is uniquely qualified to provide the expertise and tools to allow the warrior to achieve information dominance. Almost every SSC SD project deals with acquiring data, transforming data into information, using information to operate, or moving data and information from where they reside to where they are needed. *SSC SD is at the cutting edge of technologies to support the processes of transforming data into information; information into knowledge; and knowledge into understanding.*



C4ISR Laboratories and Facilities

How We Get There

SSC SD's approach to the development of C4ISR systems embraces the concepts of evolutionary acquisition, coupled with a strong commitment to standards-based architecture. The development process is a continuous sequence of *visioneering*, *prototyping*, *demonstrating*, *integrating*, and *evolving* all the components of our C4ISR systems.

SSC SD's approach to the development and evolution of C4ISR is multidisciplinary. Our great strength at SSC SD is our unique work across the spectrum of C4ISR. This work ranges from basic research through prototyping and fully produced systems and to life-cycle support of fielded systems. Furthermore, SSC SD's facilities, laboratories, and fleet communications capabilities allow our engineers and scientists to replicate an operational environment unachievable in the commercial world. Only at SSC SD can the pieces of the overall C4ISR system be integrated and tested in both laboratory and operational contexts. We are aggressively applying our unique expertise and capabilities to the central element of future naval warfare—information dominance.

This is our vision.

This is our future.

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